

HIV CTL Epitopes

Table 2 p24

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
p24(140-152 IIIB)	p24(8-20)	GQMVHQAI ^P RTL	HIV-1 infection	human(Cw3)	[Littaua et al.(1991)]
		• Fine specificity of human Cw3 restricted Gag CTL epitope			
p24(143-164 BH10)	p24(11-32)	VHQAI ^P R ^T LNAWVK- VVEEKAF	HIV-1 infection	human(Bw57)	[Johnson et al.(1991)]
		• Gag CTL response studied in three individuals; epitopes mapped by peptide competition			
p24(143-162 LAI)	p24(11-32)	VHQAI ^P R ^T LNAWVK- VVEEKAF	HIV-1 infection	human(not A2)	[van Baalen et al.(1996)]
		• Unknown HLA specificity, but not A2			
p24(147-155 IIIB)	p24(15-23)	ISPRTLN ^A W	HIV-1 infection	human(B57)	[Wilkes et al.(1996)]
		• Epitope defined in the context of the Pediatric AIDS Found. ARIEL project mother-infant HIV transmission study			
p24(147-155 IIIB)	p24(15-23)	ISPRTLN ^A W	HIV-1 infection	human(B57)	[Brander & Walker(1996)]
		• P. Johnson et. al 1991, and P. Goulder in press, AIDS Res Hum Retrovir, and B. Wilkes			
p24(151-159)	p24(19-27)	TLNAWVKVV	HIV-1 infection	human(A2)	[Parker et al.(1992), Parker et al.(1994)]
		• Study of sequence motifs preferred for peptide binding to class I HLA A2			
p24(153-174 BH10)	p24(21-42)	NAWVKV ^V EKA ^F SPE- VIPMFSA	HIV-1 infection	human(Bw57)	[Johnson et al.(1991)]
		• Gag CTL response studied in three individuals; epitopes mapped by peptide competition			
p24(162-172 LAI)	p24(30-40)	KAFSPEV ^I PMF	?	human(B57)	[Brander & Walker(1996)]
		• P. Goulder, in press in AIDS Res Human Retroviruses			
p24(163-182)	p24(31-50)	AFSPEV ^I PMFSALSE- GATPQ	HIV infection	human(?)	[Lieberman et al.(1995)]
		• HIV-specific CTL lines developed by <i>ex vivo</i> stimulation with peptide			
p24(164-183)	p24(31-50)	AFSPEV ^I PMFSALSE- GATPQ	HIV-1 infection	human(A26)	[Goulder, per. comm.(1995)]
		• More refined characterization of this epitope is in progress, P. Goulder, per. comm.			
p24(167-175 LAI)	p24(35-43)	EVIPMF ^S AL	?	human(A26)	[Brander & Walker(1996)]
		• P. Goulder, in press in AIDS			
p24(168-175 LAI)	p24(36-43)	VIPMF ^S AL	?	human(Cw01.02)	[Brander & Walker(1996)]
		• P. Goulder, submitted			
p24(169-184 LAI)	p24(37-52)	IPMF ^S ALSEGATPQD- L	HIV-1 infection	human(B12(44))	[Buseyne et al.(1993)]
		• Clustering of Gag p24 CTL epitopes recognized in 29 HIV infected people			
p24(173-194 BH10)	p24(41-62)	SALSEGATPQDLNTM- LNTVG ^G H	HIV-1 infection	human(B14)	[Johnson et al.(1991)]
		• Gag CTL response studied in three individuals; epitopes mapped by peptide competition			

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p24(179-187 IIIB)	p24(47-55)	ATPQDLNTM	HIV-1 infection	human(B7)	[Wilkes et al.(1996)]
		• Epitope defined in the context of the Pediatric AIDS Found. ARIEL project mother-infant HIV transmission study			
		• APPQDLNTM, a naturally occurring variant, was found in non-transmitting mother and was 'less' recognized			
p24(180-188 IIIB)	p24(48-56)	TPQDLNTML	HIV-1 infection	human(?B7)	[Wilkes et al.(1996)]
		• Epitope defined in the context of the Pediatric AIDS Found. ARIEL project mother-infant HIV transmission study			
p24(183-191 LAI)	p24(51-59)	DLNTMLNTV	HIV-1 infection	human(B14)	[McMichael & Walker(1994)]
		• Review of HIV CTL epitopes; defined by B14 motif found within a larger peptide			
p24(194-202 LAI)	p24(62-70)	HQAAMQMLK	?	human(B52)	[Brander & Walker(1996)]
		• P. Goulder, pers. comm.			
p24(193-214 BH10)	p24(61-82)	GHQAAMQMLKETINE- EAAEWDR	HIV-1 infection	human(Bw52)	[Johnson et al.(1991)]
		• Gag CTL response studied in three individuals; epitopes mapped by peptide competition			
p24(193-203 BRU)	p24(61-71)	GHQAAMQMLKE	HIV-1 infection	human(A2)	[Claverie et al.(1988)]
		• 1 of 4 epitopes first predicted, then shown to stimulate HLA-A2 restricted CTL line			
p24(203-212)	p24(71-80)	ETINEEAAEW	HIV-1 infection	human(A25)	[Klenerman et al.(1996)]
		• The epitope is in a conserved region; ETINEEAAEW is found in most B, D, and E subtype isolates, and DTINEEAAEW is found in A and some D; and was defined through direct stimulation of PBMC with 20-mer peptides			
p24(203-212)	p24(71-80)	ETINEEAAEW	HIV-1 infection	human(A25)	[van Baalen et al.(1996)]
		• Conserved between B and D subtypes, variable in other clades; a consensus of clades A,C, F, G, and H and a peptide of HIV-2ROD over this region were not recognized by CTL recognizing the index peptide; no variants in this epitope were observed in a long term survivor over 8 years			
p24(215-223 IIIB)	p24(83-92)	VHPVHAGPIA	HIV-1 infection	human(B55?)	[Sipsas et al.(1996)]
		• Optimal epitope but uncertain HLA allele			
p24(219-233 BRU)	p24(87-101)	HAGPIAPGQMREPRG	HIV-1 infection	human(A2)	[Claverie et al.(1988)]
		• 1 of 4 epitopes predicted then shown to stimulate HLA-A2 restricted CTL line			
p24(240-249 LAI)	p24(108-117)	TSTLQEIQIGW	HIV-1 infection	human(B57,B5801)	[Goulder, per. comm.(1995)]
		• This is the optimal peptide; response in 3/4 HLA-B57 individuals, 2 were long term survivors			
		• B5801 B cells make good targets, but not yet tested in HLA-B5801 individuals, P. Goulder, in press in ARHR			
p24(253-274 BH10)	p24(121-142)	NPPIPVGEGIYKRWII- LGLNKIV	HIV-1 infection	human(B8)	[Johnson et al.(1991)]
		• Gag CTL response studied in three individuals; epitopes mapped by peptide competition			
p24(253-272)	p24(121-140)	NPPIPVGEGIYKRWII- LGLNK	HIV infection	human(?)	[Lieberman et al.(1995)]
		• HIV-specific CTL lines developed by <i>ex vivo</i> stimulation with peptide			
p24(253-267)	p24(121-135)	NPPIPVGEGIYKRWII	HIV-1 infection	human(B8)	[Gotch et al.(1990)]
		• High frequency of memory and effector Gag specific CTL			

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Location	WEAU	Sequence	Immunogen	Species(HLA)	References
p24(255-274 SF2)	p24(121-140)	NPPIPVG EIYKRWII-LGLNK	HIV-1 infection	human(?)	[van Baalen et al.(1993)]
		• Gag CTL epitope precursor frequencies estimated and peptide mapping			
p24(255-274 SF2)	p24(121-135)	NPPIPVG EIYKRWII	HIV-1 infection	human(B8)	[Phillips et al.(1991)]
		• Longitudinal study of CTL escape mutants			
p24(256-270 LAI)	p24(124-138)	IPV GEIYKRWIILGL	HIV-1 infection	human(B8)	[Buseyne et al.(1993)]
		• Clustering of Gag p24 CTL epitopes recognized in 29 HIV infected people			
p24(260-268 LAI)	p24(122-130)	PPIPVGDIY	HIV-1 or -2 infec- tion	human(B35)	[Rowland-Jones et al.(1995)]
		• Defined as minimal peptide by titration curve, PPIPV GEIY and HIV-2 form NPVPVGNIY also recognized			
p24(260-269 HIV-2)	p24(130-140)	RRWIQLGLQK	?	human(B27)	[Brander & Walker(1996)]
		• HIV-2, HLA subtype B*2703, S. Rowland-Jones, pers. comm.			
p24(260-268 LAI)	p24(122-130)	PPIPVGDIY	HIV-1 infection	human(B35)	[McMichael & Walker(1994)]
		• Review of HIV CTL epitopes; defined as minimal peptide by titration curve			
p24(261-269)	p24(127-135)	GEIYKRWII	HIV-1 infection	human(B8)	[Sutton et al.(1993)]
		• Predicted epitope based on B8 binding motifs, from larger peptide NPPIPVG EIYKRWII			
p24(259-267 LAI)	p24(127-135)	GEIYKRWII	HIV-1 infection	human(B8)	[Klenerman et al.(1994)]
		• Naturally occurring variant GDIYKRWII may act as antagonist			
p24(259-267)	p24(127-135)	GEIYKRWII	HIV-1 infection	human(B8)	[Nowak et al.(1995)]
		• Longitudinal study of CTL response; GDIYKRWII could also stimulate CTL, reactivity fluctuated			
p24(259-267)	p24(127-135)	GEIYKRWII	HIV-1 infection	human(B8)	[McAdam et al.(1995)]
		• Equivalent sequence GDIYKRWII also recognized by CTL from some donors			
p24(265-280 BRU)	p24(130-148)	YKRWIILGLNKIVRM- YSPT	HIV-1 infection	human(B27)	[Dadaglio et al.(1991)]
		• Used as a positive control for HLA specificity			
p24(263-284 BH10)	p24(131-152)	KRWIILGLNKIVRMY- SPTSLD	HIV-1 infection	human(Bw62)	[Johnson et al.(1991)]
		• Gag CTL response studied in three individuals; epitopes mapped by peptide competition			
p24(265-284 SF2)	p24(131-150)	KRWIILGLNKIVRMY- SPTSI	HIV-1 infection	human(Bw62?)	[van Baalen et al.(1993)]
		• Gag CTL epitope precursor frequencies estimated; HLA Bw62 restriction considered most likely			
p24(266-277)	p24(131-145)	KRWIILGLNKIVRMY	rec gag-vaccinia	human(B27)	[Nixon et al.(1988)]
		• Gag CTL epitope mapped with rec gag-vaccinia and synthetic peptides			
p24(263-277 LAI)	p24(131-145)	KRWIILGLNKIVMRY	HIV-1 infection	human(A33))	[Buseyne et al.(1993)]
		• Clustering of Gag p24 CTL epitopes recognized in 29 HIV infected people			
p24(266-277 LAI)	p24(131-145)	KRWIILGLNKIVMRY	HIV-1 infection	human(B27)	[Meyerhans et al.(1991)]
		• Longitudinal study showing persistence of epitope despite CTL activity			

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Location	WEAU	Sequence	Immunogen	Species(HLA)	References
p24(265-279)	p24(131-145)	KRWIILGLNKIVRMY	HIV-1 infection	human(B27)	[Nixon et al.(1990)]
		• HIV 1 and HIV 2 cross-reactive CTL clone, highly conserved epitope			
p24(265-279C)	p24(131-146)	KRWIILGLNKIVRMY-C	HIV-1 infection	human(B27)	[Bouillot et al.(1989)]
		• HLA B27 restricted epitope also binds to HLA A2 and HLA B37 in solid phase assay			
p24(265-276)	p24(131-142)	KRWIILGLNKIV	no CTL shown	human(B27)	[Jardetzky et al.(1991)]
		• Epitope examined in the context of peptide binding to HLA B27			
p24(263-272 LAI)	p24(131-140)	KRWIILGLNK	HIV-1 infection	human(B27)	[Buseyne et al.(1993)]
		• Clustering of Gag p24 CTL epitopes recognized in 29 HIV infected people			
p24(263-272 LAI)	p24(131-140)	KRWIILGLNK	HIV-1 infection	human(B27)	[McMichael & Walker(1994)]
		• Review of HIV CTL epitopes; defined as minimal peptide by titration curve			
p24(263-272)	p24(131-140)	KRWIIMGLNK	HIV-1 infection	human(B27)	[Klenerman et al.(1994)]
		• Naturally occurring variant KRWIILGLNK may act as antagonist			
p24(263-272)	p24(131-140)	KRWIIMGLNK	HIV-1 infection	human(B27)	[Klenerman et al.(1995)]
		• Naturally occurring variant KRWIILGLNK may act as antagonist			
p24(265-276)	p24(131-140)	KRWIILGLNK	?	human(B27)	[Carreno et al.(1992)]
		• Included in B27 binding peptide competition study			
p24(265-274 SF2)	p24(131-140)	KRWIILGLNK	HIV-1 infection	human(B27)	[Phillips et al.(1991)]
		• Longitudinal study of CTL escape mutants			
p24(263-272)	p24(131-140)	KRWIILGLNK	HIV-1 infection	human(B27)	[Nietfeld et al.(1995)]
		• Single point mutations were introduced and viral viability and CTL recognition tested			
p24(263-272)	p24(131-139)	KRWIIMGNK	HIV-1 infection	human(B27)	[Nowak et al.(1995)]
		• Longitudinal study of CTL response; KRWIILGNK was also found, both forms stimulate CTL			
p24(273-282 IIIB)	p24(143-150)	RMYSPTSI	HIV-1 infection	human(B52)	[Wilkes et al.(1996)]
		• Epitope defined in the context of the Pediatric AIDS Found. ARIEL project mother-infant HIV transmission study			
p24(268-277 LAI)	p24(136-145)	LGLNKIVRMY	Predicted from larger peptide	human(Bw62)	[McMichael & Walker(1994)]
		• Review of HIV CTL epitopes; defined by Bw62 motif found within a larger peptide			
		• Also P. Johnson, per comm			
p24(298-306 IIIB)	p24(166-174)	DRFYKTLRA	HIV-1 infection	human(B14)	[Wilkes et al.(1996)]
		• Epitope defined in the context of the Pediatric AIDS Found. ARIEL project mother-infant HIV transmission study			
		• DRFYKILRA, a naturally occurring variant, was found in mother, and is recognized			
		• DQFYKTLRA, a naturally occurring variant, was found in infant and is not recognized			
p24(298-306 LAI)	p24(166-174)	DRFWKTLRA	HIV-1 infection	human(B14)	[Harrer et al.(1996b)]

HIV CTL Epitopes

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
p24(305-313)	p24(173-181)	RAEQASQEV	HIV-1 infection	human(Cw8)	[Johnson et al.(1991)]
	• Originally reported as HLA B14 restricted, but subsequently found not to be presented				
	• by cells transfected with B14. Thought to be Cw8 restricted (C. Brander and B. Walker)				
p24(305-313)	p24(173-181)	RAEQASQEV	HIV-1 infection	human(B14?)	[Price et al.(1995)]
	• Study of cytokines released by HIV-1 specific activated CTL; HLA restriction uncertain, see p24(305-314)				
p24(311-319 LAI)	p24(176-184)	QASQEVKNW	?	human(B57)	[Brander & Walker(1996)]
	• P. Goulder, in press in AIDS Res and Human Retroviruses, QASQDVKNW is recog. as well				
p24(313-322 LAI)	p24(181-190)	VKNWMTETLL	?	human(B8)	[Brander & Walker(1996)]
	• P. Johnson pers. comm.				
p24(323-337)	p24(191-205)	VQNaNPDCKTILKAL	HIV-1 infection	human(B8)	[Nixon & McMichael(1991)]
	• Two CTL epitopes defined				
p24(325-339 SF2)	p24(191-205)	VQNaNPDCKTILKAL	HIV-1 infection	human(B8)	[Phillips et al.(1991)]
	• Longitudinal study of CTL escape mutants				
p24(325-333 IIIB)	p24(193-201)	NANPDCKTI	HIV-1 infection	human(B51)	[Wilkes et al.(1996)]
	• Epitope defined in the context of the Pediatric AIDS Found. ARIEL project mother-infant HIV transmission study				
p24(329-337 LAI)	p24(197-205)	DCKTILKAL	?	human(B8)	[Sutton et al.(1993)]
	• Predicted epitope based on B8 binding motifs, from larger peptide VQNaNPDCKTILKAL				
p24(329-337)	p24(197-205)	DCKTILKAL	HIV-1 infection	human(B8)	[Nowak et al.(1995)]
	• Longitudinal study of CTL response; DCRTILKAL was also found, binds but not recognized				
p24(329-337)	p24(197-205)	DCKTILKAL	?	human(B8)	[McAdam et al.(1995)]
	• defined as minimal epitope by titration and binding studies				
p24(345-364 SF2)	p24(211-230)	LEEMMTACQGVGGPG- HKARV	HIV-1 infection	human(?)	[van Baalen et al.(1993)]
	• Gag CTL epitope precursor frequencies estimated, peptide mapping				
p24(349-359 IIIB)	p24(217-227)	ACQGVGGPGHK	HIV-1 infection	human(A11)	[Sipsas et al.(1996)]
p24(355-363 LAI)	p24(223-231)	GPGHKARVL	?	human(B7)	[Brander & Walker(1996)]
	• P. Goulder, pers. comm.				